HEAT CONTROLLER, INC.

APPLICATION, OPERATION & MAINTENANCE MANUAL

DXM2 Digital Heat Pump Controller

Heat Controller, Inc. • 1900 Wellworth Ave. • Jackson, MI 49203 • (517)787-2100 • www.heatcontroller.com

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DXM2 Electronic Heat Pump Controls

DXM2 OVERVIEW
The manufacturer's next generation control board, DXM2, is the geothermal industry's first two-way communication.

The DXM2 electronic control is a robust, microprocessor based heat pump controller that is advanced and feature-laden for maximum application flexibility. The DXM2 Control has relay outputs for Compressor, Compressor Speed, Reversing Valve, Alarm Relay, and 2 configurable relays for Fan, Fan Speed, HWG Pump, and Loop Pump, and 2 configurable accessory relay outputs. For on board diagnostics, there are 2 LED's to provide status indication.

There are inputs for safety pressure switches, low temperature protection thermistors, condensate overflow sensor, DIP switch selection inputs, thermostat inputs, night setback inputs, and emergency shutdown input. Additional configurable temperature sensor inputs are available that may be used for hot water, compressor discharge, leaving air, leaving water, and entering water temperature sensors.

The DXM2 has an RS485 communications port to interface with a communicating thermostat or other compatible controls.

DXM2 Controller Part Number:
17B0002N02 DXM2 Control Board

General Operating Parameters
The following are general operating parameters for the DXM2 Control:
- Operating Environment: -40°F to 176°F and up to 95% relative humidity, non-condensing.
- Storage Environment: -40°F to 185°F and up to 95% relative humidity, non-condensing.

Power Requirements
DXM2 only power draw -
- Normally 8 VA draw at 24VAC
- Maximum 12 VA draw at 24VAC. A dedicated 24VAC, 50-60Hz, 1Ph, 40VA transformer minimum is required for typical WSHP application.

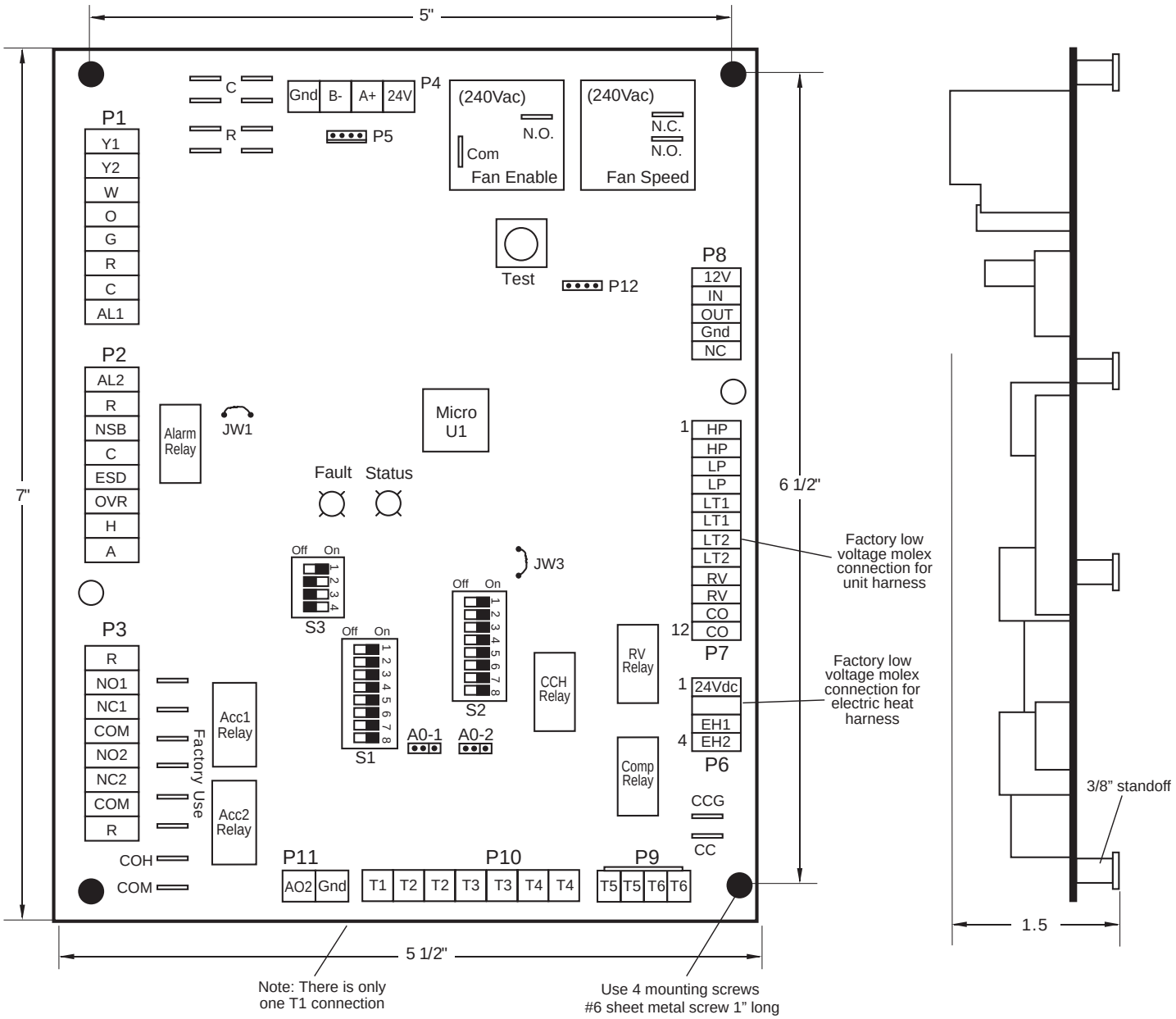
Relay and Connection Contact Ratings
The following relays are mounted on the DXM2 Control:
- Compressor Relay: 40VA at 24VAC
- Compressor Speed Relay: 28VA at 24VAC
- Alarm Relay: 28VA at 24VAC
- Reversing Valve: 28VA at 24VAC
- Accessory Relay 1: 28VA at 24VAC
- Accessory Relay 2: 28VA at 24VAC
- Fan Enable / Loop Pump Relay: 1 HP at 240VAC
- Fan Speed / HWG Pump Relay: 1 HP at 240VAC
- Connection ratings on the DXM2 Control:
- 'A' terminal: 20VA at 24VAC. Larger solenoid valve draw should be controlled with accessory relays.

Grounding
The control board must be grounded from one of the C terminals.

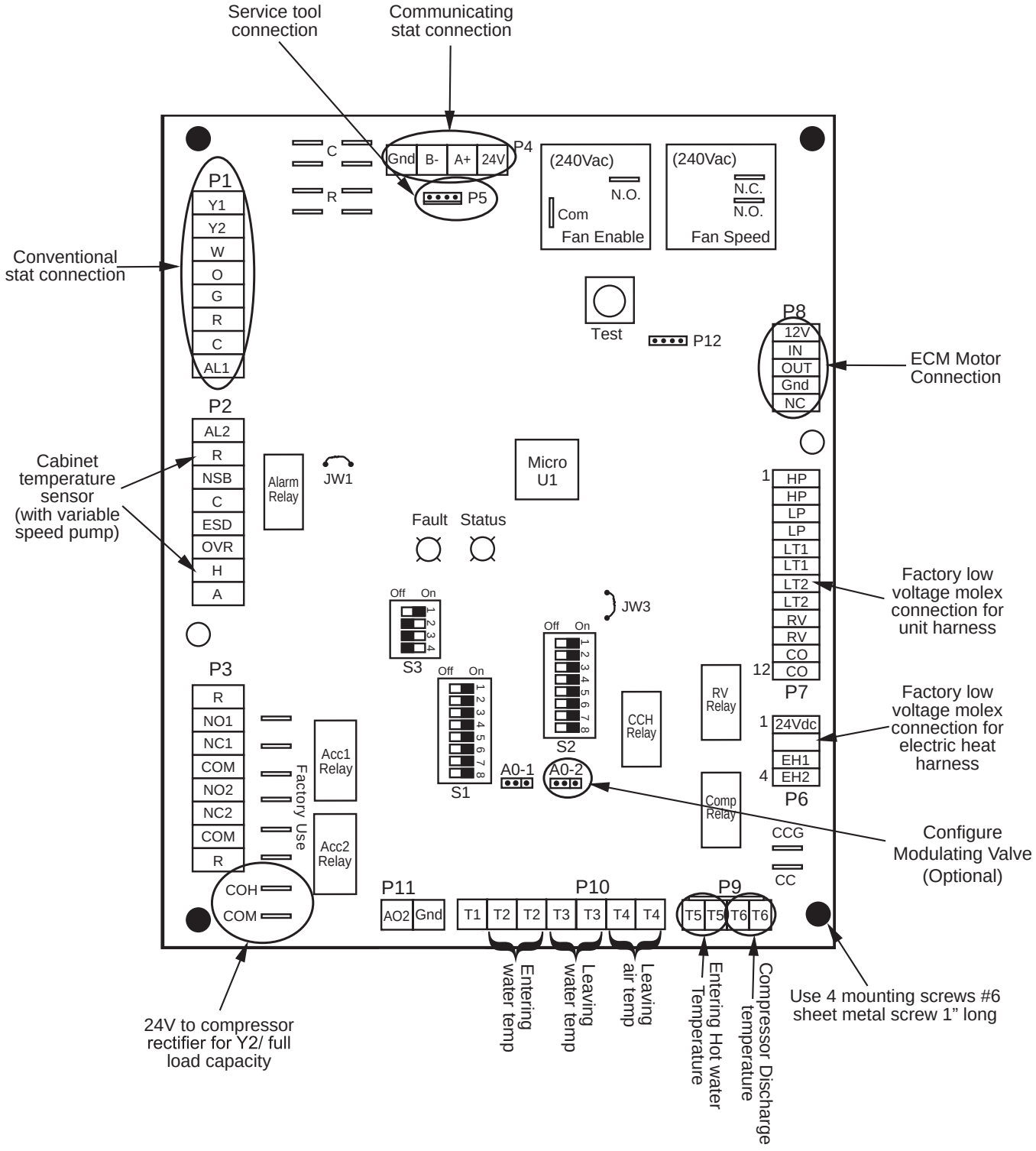
Basic Control Features
- Single or two–stage compressor control
- Anti-short cycle protection
- High pressure cut-out
- Loss of charge cut-out
- High and low voltage cut-outs
- Water coil low temperature cut-out
- Air coil low temperature cut-out
- Random start
- Status LED and Fault LED
- Reset lockout at unit or disconnect
- Condensate overflow sensor
- Intelligent fault retry
- Test Mode
- Multiple blower configuration options
- Electric heat outputs
- Accessory water valve connection

Advanced Control Features
- Direct control of ECM blower
- Intelligent hot water generator control
- Two accessory relays configurable for multiple applications
- Internal Flow Center output
- Proportional valve output
- Night setback with override capability
- Emergency shutdown capability
- Removable thermostat connector for ease of installation and service
- Accepts conventional heat pump (Y,O) or heat/cool (Y,W) thermostat types
- RS–485 port to interface with a communicating thermostat or other compatible controls
- Boilerless electric heat
- Configurable inputs and outputs for advanced functions

DXM2 Physical Dimensions & Layout



DXM2 Layout and Connections



DXM2 Controls

THERMOSTAT COMPATABILITY - IT IS STRONGLY RECOMMENDED THAT A COMMUNICATING THERMOSTAT (7602-443) BE USED WITH GEOMAX COMMUNICATING SYSTEMS FOR:

1. Four-wire connections between the thermostat, compressor section (HTS), and air handler (WDG).
2. Configuring, monitoring and diagnosing the system in PLAIN ENGLISH on the thermostat.

FIELD SELECTABLE INPUTS

Test mode: Test mode allows the service technician to check the operation of the control in a timely manner. By **momentarily** pressing the TEST pushbutton, the DXM2 control enters a 20 minute test mode period in which all time delays are sped up 15 times. Upon entering test mode, the Status and Fault LED displays will change. The Status LED will either flash rapidly to indicate the control is in the test mode, or display a numeric flash code representing the current airflow if an ECM blower is connected and operating. The Fault LED will display the most recent fault condition in memory. Note: A flash code of 1 indicates there have been no faults stored in memory. For diagnostic ease at conventional thermostats, the alarm relay will also cycle during test mode. The alarm relay will cycle on and off similar to the Fault LED to indicate a code representing the last fault, at the thermostat.
The test mode can be exited by pressing the TEST pushbutton for 3 seconds. The test Mode can also be entered and exited by cycling the G input, 3 times within a 60 second time period.

During Test Mode, the control monitors to see if the LT1 and LT2 thermistors are connected and operating properly. If the control is in Test Mode, the control will lockout, with Code 9, after 60 seconds if:

a) the compressor is On in Cooling Mode and the LT1 sensor is colder than the LT2 sensor. or,

b) the compressor is On in Heating Mode and the LT2 sensor is colder than the LT1 sensor.

Retry Mode: If the control is attempting a retry of a fault, the Fault LED will slow flash (slow flash = one flash every 2 seconds) to indicate the control is in the process of retrying.

Field Configuration Options - Note: In the following field configuration options, jumper wires should be clipped ONLY when power is removed from the DXM2 control.

Note: Jumper 3 must not be clipped prior to adding antifreeze to the water loop. Antifreeze protection to 10°F required. Clipping JW3 without antifreeze may result in freeze damage and will void the unit warranty.

Water coil low temperature limit setting: Jumper 3 (JW3-LT1 Low Temp) provides field selection of temperature limit setting for LT1 of 30°F or 10°F [-1°F or -12°C] (refrigerant temperature).
Not Clipped = 30°F. Clipped = 10°F.

Alarm Relay Setting - Jumper 1 (JW1-AL2 Dry) provides field selection of alarm function when Alarm Relay is energized.
Not Clipped = AL1 connected to R (24VAC) with Alarm Relay active.
Clipped = Dry contact connection between AL1 and AL2 with Alarm Relay active.

JUMPERS (Set at Factory)
A0-2: Configure Modulating Valve (Optional)

Set A0-2 jumper (see Figure on page 5) to “IOV” if using Internal Modulating Motorized Valve (optional).

DIP SWITCHES
Note: In the following field configuration options, DIP switches should only be moved when power is removed from the DXM2 Control to ensure proper operation.

DIP Package #1 (S1)

DIP Package #1 is 8 position and provides the following setup selections.

DIP 1.1: Unit Performance Sentinel Disable - Provides field selection to disable the UPS feature.

On = Enabled. Off = Disabled.

DIP 1.2: Compressor Relay Staging Operation - Provides selection of Compressor Relay staging operation. The Compressor Relay can be selected to turn on with Stage 1 or Stage 2 call from the thermostat. This is used with Dual Stage units (2 compressors where 2 DXM2 Controls are being used) or with master/slave applications. In master/slave applications, each compressor and fan will stage according to its appropriate DIP 1.2. If set to stage 2, the compressor will have a 3 second on-delay before energizing during a Stage 2 demand. Also, if set for stage 2, the Alarm Relay will NOT cycle during Test Mode.

On = Stage 1. Off = Stage 2.

DIP 1.3: Thermostat Type (Heat/Cool) - Provides selection of thermostat type. Heat Pump or Heat/Cool thermostats can be selected. When in Heat/Cool Mode, Y1 is input call for Cooling Stage 1, Y2 is input call for Cooling Stage 2, W1 is input call for Heating Stage 1, and O/W2 is input call for Heating Stage 2. In Heat Pump Mode, Y1 is input call for Compressor Stage 1, Y2 is input call for Compressor Stage 2, W1 is input call for Heating Stage 3 or Emergency Heat, and O/W2 is the input call for RV (heating or cooling dependent upon DIP 1.4).

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On = Heat Pump. Off = Heat/Cool.

DIP 1.4: Thermostat Type (O/B) - Provides selection of thermostat type. Heat pump thermostats with “O” output on with Cooling or “B” output on with Heating can be selected.

On = HP Stat with O output with cooling. Off = HP Stat with B output with heating.

DIP 1.5: Dehumidification Mode - Provides selection of normal or Dehumidification Fan Mode. In Dehumidification Mode, the fan speed will be adjusted for Cooling. In Normal Mode, the fan speed will be normal during Cooling.

On = Normal Fan Mode. Off = Dehumidification Mode.

DIP 1.6: DDC Output at EH2 - DIP Switch 1.6 provides selection for DDC operation. If set to DDC Output at EH2, the EH2 terminal will continuously output the last fault code of the controller. If set to EH2 normal, then the EH2 will operate as standard electric heat output.

On = EH2 Normal. Off = DDC Output at EH2.

DIP 1.7: Boilerless Operation - Provides selection of Boilerless Operation. In Boilerless Mode, only the compressor is used for Heating Mode when LT1 is above the temperature specified by the setting of DIP 1.8. If DIP 1.8 is set for 50°F, then the compressor is used for heating as long as LT1 is above 50°F. Below 50°F, the compressor is not used and the control goes into Emergency Heat Mode, staging on EH1 and EH2 to provide heating.

On = normal. Off = Boilerless operation.

DIP 1.8: Boilerless Changeover Temperature - Provides selection of boilerless changeover temperature setpoint.

On = 50°F. Off = 40°F.

DIP Package #2 (S2)

DIP Package #2 (S2) - A combination of dip switches 2.1, 2.2, 2.3, and 2.4, 2.5, 2.6 deliver configuration of ACC1 and ACC2 relay options respectively. See Table 7a for description and functionality.

DIP 2.7: Auto Dehumidification Fan Mode or High Fan Mode - Provides selection of Auto Dehumidification Fan Mode or High Fan Mode. In Auto Dehumidification Mode, the Fan Speed will be adjusted during Cooling IF the H input is active. In High Fan Mode, the Fan will operate on high speed when the H input is active.

On = Auto Dehumidification Mode (default). Off = High Fan Mode.

DIP 2.8: Factory Setting - Normal position is On. Do not change selection unless instructed to do so by the Factory.

DIP Package #3 (S3)

DIP Package #3 is 4 position and provides the following setup selections.

DIP 3.1: Communications configuration: Provides selection of the DXM2 operation in a communicating system. The DXM2 may operate as a communicating master or slave device depending on the network configuration. In most configurations, the DXM2 will operate as a master device.

On = Communicating Master device (default). Off = communicating Slave device.

Table 1: Accessory Relay 1 Configuration

DIP 2.1	DIP 2.2	DIP 2.3	ACC1 Relay Option
ON	ON	ON	Cycle with fan
OFF	ON	ON	Digital night setback
ON	OFF	ON	Water valve – Slow opening
ON	ON	OFF	Outside air damper
OFF	ON	OFF	Whole House Dehumidification option – Dehumidistat
OFF	OFF	OFF	option – Humidistat
OFF	OFF	ON	Hydronic Economizer – 1st Stage
ON	OFF	OFF	Hydronic Economizer – Both Stages

All other DIP combinations are invalid

Table 2: Accessory Relay 2 Configuration

DIP 2.4	DIP 2.5	DIP 2.6	ACC2 Relay Option
ON	ON	ON	Cycle with compressor
OFF	ON	ON	Digital night setback
ON	OFF	ON	Water valve – Slow opening
OFF	OFF	ON	Humidifier
ON	ON	OFF	Outside air damper

All other DIP combinations are invalid

DIP 3.2: HWG Test Mode: Provides forced operation of the HWG pump output, activating the HWG pump output for up to five minutes.

On = HWG test mode. Off = Normal HWG mode (default).

DIP 3.3: HWG Temperature: Provides the selection of the HWG operating setpoint.

On = 150°F [66°C]. Off = 125°F [52°C] (default).

DIP 3.4: HWG Status: Provides HWG operation control.

On = HWG mode enabled. Off = HWG mode disabled

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(default)

SAFETY FEATURES
The following safety features are provided to protect the compressor, heat exchangers, wiring and other components from damage caused by operation outside of design conditions.

Anti-Short Cycle Protection - The control features a 5 minute anti-short cycle protection for the compressor.

Note: The 5 minute anti-short cycle also occurs at power up.

Random Start - The control features a 5-80 second random start upon power up. The random start delay will be present after a control power up and after returning from Night Setback or Emergency Shutdown modes.

Extended Compressor Operation Monitoring - If the compressor relay has been on for 4 continuous hours, then the control will automatically turn off the compressor relay and wait the short cycle protection time. All appropriate safeties will be monitored during the off time. If all operation is normal, and if the compressor demand is still present, the control will turn the compressor back on.

Fault Retry - In Fault Retry Mode, the Fault LED begins slow flashing to signal that the control is trying to recover from a fault input. The DXM2 Control will stage off the outputs and then "try again" to satisfy the thermostat call for compressor. Once the thermostat input calls are satisfied, the control will continue on as if no fault occurred. If 3 consecutive faults occur without satisfying the thermostat call for compressor, then the control will go to Lockout Mode. The last fault causing the lockout will be stored in memory and is displayed at the Fault LED by entering the Test mode.

Note: LT1 and LT2 faults are factory set for one try, so there will be no "retries" for LT1 and LT2 faults. The control will only try one time for these faults.

FAULT CODES

Lockout - In Lockout Mode, the Fault LED will begin fast flashing. The compressor relay is turned off immediately. The fan output will be turned off after the current blower off delay unless auxiliary heat is active. The Lockout Mode can be "soft" reset via the thermostat by removing the call for compressor, or by a "hard" reset (disconnecting power to the control). The fault code will be stored in non-volatile memory that can be displayed by the Fault LED by entering the Test mode, even if power was removed from the control.

Lockout with Emergency Heat - If the DXM2 is configured for Heat Pump thermostat Mode (see DIP 1.3), the DXM2 is in Lockout Mode, and the W input becomes active, then Emergency Heat Mode will occur during Lockout. For Emergency Heat, the fan and auxiliary heat outputs will be activated.

⚠ CAUTION! ⚠

CAUTION! Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

Fault Code 2: High Pressure Switch – When the High Pressure switch opens due to high refrigerant pressures, the compressor relay is de–energized immediately. The High Pressure fault recognition is immediate (does not delay for 30 continuous seconds before de–energizing the compressor). When the Test mode is activated, the Fault LED will display a fault code of 2 for a High Pressure fault.

Fault Code 3: Loss of Charge Switch – The Loss of Charge Switch must be open and remain open for 30 continuous seconds during a compressor "on" cycle to be recognized as a Loss of Charge fault. If the Loss of Charge switch is open for 30 seconds prior to compressor power up it will be considered a Loss of Charge fault. The Loss of Charge Switch input is bypassed for the initial 120 seconds of a compressor run cycle. When the Test mode is active, the Fault LED will display a fault code of 3 for a Loss of Charge fault.

Fault Code 4: Water Coil Low Temperature Cut-Out Limit (LT1) - The control will recognize an LT1 fault, during a compressor run cycle if:

a) the LT1 thermistor temperature is below the selected low temperature protection limit setting for at least 50 seconds, AND

b) the LT1 thermistor temperature is rising (getting warmer) at a rate LESS than 2°F per 30 second time period.

The LT1 input is bypassed for the initial 120 seconds of a compressor run cycle. When the Test mode is active, the Fault LED will display a fault code of 4 for a LT1 fault.

Fault Code 5: Air Coil Low Temperature Cut-Out (LT2) - The control will recognize an LT2 fault, during a compressor run cycle if:

a) the LT2 thermistor temperature is below the low temperature protection limit setting for at least 50 seconds, AND

b) the LT2 thermistor temperature is rising (getting warmer) at a rate LESS than 2°F per 30 second time period.

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The LT2 input is bypassed for the initial 120 seconds of a compressor run cycle. When the Test mode is active, the Fault LED will display a fault code of 5 for a LT2 fault.

Fault Code 6: Condensate Overflow - The Condensate Overflow sensor must sense overflow levels for 30 continuous seconds to be recognized as a CO fault. Condensate Overflow will be monitored at all times during the compressor run cycle. When the Test mode is active, the Fault LED will display a fault code of 6 for a Condensate Overflow fault.

Fault Code 7: Over/Under Voltage Shutdown - An Over/Under Voltage condition exists when the control voltage is outside the range of 18VAC to 31.5VAC. Over/UnderVoltage Shutdown is self-resetting in that if the voltage comes back within range of 18.5VAC to 31VAC for at least 0.5 seconds, then normal operation is restored. This is not considered a fault or lockout. If the DXM2 is in over/under voltage shutdown for 15 minutes, the Alarm Relay will close. When the Test mode is active, the Fault LED will display a fault code of 7 for an Over/Under Voltage Shutdown.

Fault Code 8: Unit Performance Sentinel – UPS – The UPS feature warns when the heat pump is operating inefficiently. A UPS condition exists when:

a) In Heating Mode with compressor energized, if LT2 is greater than 125°F for 30 continuous seconds, or

b) In Cooling Mode with compressor energized, if LT1 is greater than 125°F for 30 continuous seconds, OR LT2 is less than 40°F for 30 continuous seconds.

If a UPS condition occurs, the control will immediately go to UPS warning. The status LED will remain on as if the control is in Normal Mode. (see “LED and Alarm Relay Operation Table”). Outputs of the control, excluding Fault LED and Alarm Relay, will NOT be affected by UPS. The UPS condition cannot occur during a compressor off cycle. During UPS warning, the Alarm Relay will cycle on and off. The cycle rate will be On for 5 seconds, Off for 25 seconds, On for 5 seconds, Off for 25 seconds, etc. When the Test mode is active, the Fault LED will display a fault code of 8 for an UPS condition.

Fault Code 9: Swapped LT1/LT2 Thermistors - During Test Mode, the control monitors to see if the LT1 and LT2 thermistors are connected and operating properly. If the control is in Test Mode, the control will lockout, with Code 9, after 60 seconds if:

a) the compressor is On in Cooling Mode and the LT1 sensor is colder than the LT2 sensor. Or,

b) the compressor is On in Heating Mode and the LT2 sensor is colder than the LT1 sensor.

When the Test mode is active, the Fault LED will display a fault code of 9 for a Swapped Thermistor fault.

Fault Code 10: ECM Blower Fault – When operating an ECM blower, there are two types of ECM Blower fault conditions that may be detected.

a) An ECM blower fault will be detected and the control will lockout after 15 seconds of blower operation with the blower feedback signal reading less than 100 RPM.

b) An ECM blower fault will be detected when the ECM configuration is incorrect or incomplete. For this fault condition, the control will continue to operate using default operating parameters.

When the Test mode is active, the Fault LED will display a fault code of 10 for an ECM Blower fault.

Fault Code 11: Low Air Coil Pressure Switch (Whole House Dehumidification Units Only) – When the Low Air Coil Pressure switch opens due to low refrigerant pressure in the cooling or reheat operating mode, the compressor relay is de–energized immediately. The Low Air Coil Pressure fault recognition is immediate (does not delay for 30 continuous seconds before de–energizing the compressor). When the Test mode is activated, the Fault LED will display a fault code of 11 for a Low Air Coil Pressure fault. Note: Low Air Coil Pressure fault will keep the unit from operating in the cooling or reheat modes, but heating operation will still operate normally.

Fault Code 12: Low Air Temperature (Whole House Dehumidification Units Only) – The control will recognize an Low Air Temperature fault, during cooling, reheat, or constant fan operation if the LAT thermistor temperature is below 35 degrees for 30 continuous seconds. When the Test mode is activated, the Fault LED will display a fault code of 12 for a Low Air Temperature fault. Note: Low Air Temperature fault will keep the unit from operating in the cooling, reheat, or constant fan modes, but heating operation will still operate normally.

Diagnostic Features

The green Status LED and red Fault LED on the DXM2 Control advise service personnel of the current status of the DXM2 Control. The LED’s will indicate the current operating status of the DXM2, as well as the LAST fault in memory. If there is no fault in memory and the fault display is selected, the Fault LED will flash Code 1. See Table 3 for a complete listing of codes.

UNIT OPERATION DESCRIPTION

Power Up - The unit will not operate until all the inputs and safety controls are checked for normal conditions.

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Note: The compressor will have a 5-minute anti-short cycle delay at power-up.

Standby/Fan Only - In Standby Mode, the compressor will be off. The selected fan output(s) and RV relay may be on if appropriate inputs are present. If there is demand for constant fan, the appropriate fan output(s) will be activated for low speed operation, or constant fan airflow. If there is demand for constant high speed fan, the appropriate fan output(s) will be activated for high speed operation, or high speed constant fan airflow.

Note: DIP1.5 (Dehum Fan Mode Select) has no effect upon constant fan operation.

The RV relay will not directly track the input demands for RV, the DXM2 Control will employ “smart RV” control. This ensures that the RV will only switch positions if the thermostat has called for a Heating/Cooling Mode change.

Heating Stage 1 - In Heating Stage 1 Mode, the selected Fan output(s) and the Compressor relay are turned on immediately. If configured as Stage 2 (DIP1.2 = off), then the Compressor and Fan will not turn on until there is Stage 2 demand. The Compressor relay is turned off immediately when the Heating Stage 1 demand is removed. The selected Fan output(s) will turn off after the selected heating blower off delay, and the control then reverts to Standby Mode. If there is a Master/Slave situation or a Dual Compressor situation, all Compressor relays and related functions will track with their associated DIP1.2.

Heating Stage 2 – In Heating Stage 2 Mode, the selected Fan output(s) and Compressor relays remain on. The Compressor Speed relay is turned on, and multi–stage fan configurations switch to the appropriate operating speed for Heating Stage 2 immediately. The Compressor Speed relay is turned off immediately when the Heating Stage 2 demand is removed, and multi–speed fan configurations switch to the appropriate operating speed for Heating Stage 1 immediately, and the control reverts to Heating Stage 1 Mode. If there is a Master/Slave situation or a Dual Compressor situation, all Compressor relays and related functions will track with their associated DIP1.2.

Heating Stage 3 – In Heating Stage 3 Mode, the selected Fan output, Compressor, and Compressor Speed relays will remain on. The EH1 output will turn on immediately, and if the control is operating an ECM Blower, the airflow

Table 3: LED and Alarm Relay Output Table

DXM2 CONTROLLER FAULT CODES

DXM2 Fault and Status LED Operation with Test Mode Not Active	Fault LED (RED)	Status LED (GREEN)	Alarm Relay
DXM2 is non-functual	Off	Off	Open
Normal Operatio0n - No active communications	On	On	Open
Normal Operation - With active communications	Very Slow Flash	On	Open
Control is currently in fault retry mode	Slow Flash	----------	Open
Control is currently locked out	Fast Flash	----------	Closed
Control is currently in an over / under voltage condition	Slow Flash	----------	Open (Closed after 15 min)
Hot water mode active	----------	Slow Flash	Open
(NSB) Night setback condition recognized	----------	Flashing Code 2	----------
(ESD) Emergency shutdown condition recognized	----------	Flashing Code 3	----------
Invalid thermostat input combination	----------	Flashing Code 4	----------
High hot water temperature lockout active	----------	Flashing Code 5	----------
Hot water mode sensor fault active	----------	Flashing Code 6	----------
DXM2 Fault LED and Status Operation with Test Mode Active	**Fault LED (RED)**	**Status LED (GREEN)**	**Alarm Relay**
No fault since power up in memory	Flashing Code 1	----------	Cycling Code 1
High pressure fault in memory	Flashing Code 2	----------	Cycling Code 2
Low pressure fault in memory	Flashing Code 3	----------	Cycling Code 3
Low temperature protection 1 in fault memory	Flashing Code 4	----------	Cycling Code 4
Low temperature protection 2 fault in memory	Flashing Code 5	----------	Cycling Code 5
Condensate overflow fault in memory	Flashing Code 6	----------	Cycling Code 6
Over / Under voltage shutdown in memory	Flashing Code 7	----------	Cycling Code 7
UPS warning in memory	Flashing Code 8	----------	Cycling Code 8
UPT fault in memory	Flashing Code 9	----------	Cycling Code 9
ECM air flow fault in memory	Flashing Code 10	----------	Cycling Code 10
Test mode active with no ECM connected or operating	----------	Fast Flash	----------
Test mode active with ECM operating	----------	Flashing ECM Airflow	----------

- Fast Flash = 2 flashes every 1 second.
- Slow Flash = 1 flash every 2 seconds.
- Very Slow Flash = 1 flash every 5 seconds.
- Numeric Codes = On pulse 1/3 second; off pulse 1/3 second followed by a 10 second delay.
- ECM airflow = 1 flash per 100 CFM; on pulse 1/3 second; off pulse 1/3 second followed by a 10 second delay.

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will change to the appropriate Heating Stage 3 airflow. With continuing Heating Stage 3 demand, EH2 will turn on after 10 minutes. EH1 and EH2 are turned off immediately when the Heating Stage 3 demand is removed, and the control reverts to Heating Stage 2 Mode. During Heating Stage 3 Mode, EH2 will be off (or will turn off if already on) if LT1 is greater than 45°F AND LT2 is greater than 110°F (LT2 greater than 110°F includes the condition that LT2 is shorted). This condition will have a 30-second recognition time.

Emergency Heat - In Emergency Heat Mode, the selected fan output(s) will be activated at high speed or the appropriate airflow for Emergency Heat, and EH1 is turned on immediately. With continuing Emergency Heat demand, EH2 will turn on after 5 minutes. EH1 and EH2 are turned off immediately when the Emergency Heat demand is removed. The selected fan output(s) will turn off after the selected heating blower off delay and the control reverts to Standby Mode.

Cooling Stage 1 - In Cooling Stage 1 Mode, the selected fan output(s), Compressor, and RV relays are turned on immediately. If configured as Stage 2 (DIP1.2 = off), then the compressor and fan will not turn on until there is Stage 2 demand. The Compressor relay is turned off immediately when the Cooling Stage 1 demand is removed. The selected Fan output(s) will turn off after the selected cooling blower off delay, and the control then reverts to Standby Mode. The RV relay will remain on until there is a Heating demand. If there is a Master/Slave situation or a Dual Compressor situation, all Compressor relays and related functions will track with their associated DIP1.2.

Cooling Stage 2 - In Cooling Stage 2 Mode, the selected Fan output(s), Compressor, and RV relays remain on. The Compressor Speed relay is turned on, and multi–stage fan configurations switch to the appropriate operating speed for Cooling Stage 2 immediately. The Compressor Speed relay is turned off immediately when the Cooling Stage 2 demand is removed, and multi–speed fan configurations switch to the appropriate operating speed for Cooling Stage 1 immediately, and the control reverts to Cooling Stage 1 Mode. If there is a Master/Slave situation or a dual compressor situation, all compressor relays and related functions will track with their associated DIP1.2.

Night Low Limit (NLL) Staged Heating - In NLL Staged Heating Mode, the OVR input becomes active and is recognized as a call for Heating (OVR is an alternate means of calling for Heating Mode). In NLL Staged Heating Mode, the control will immediately go into Heating Stage 1 Mode with an additional 30 minutes of NLL demand, the control will go into Heating Stage 2 Mode. With an additional 30 minutes of NLL demand, the control will go into Heating Stage 3 Mode.

Blower Configurations – The DXM2 may be configured to operate several different blowers and blower configurations. The configurations include:

a) 2 Speed PSC Blower – The default configuration of the DXM2 is to operate for a 2 Speed PSC blower, with the K1 relay operating as a blower enable relay, and the K2 relay operating as a blower speed relay. With this configuration, the blower enable relay is momentarily de-activated when the blower speed relay is switched. For low speed blower operation (Constant Fan, Heating 1, Cooling 1, Cooling 2 with Dehumidification), K1 will be active and K2 will be inactive. For high speed blower operation (High Speed Constant Fan, Heating 2, Heating 3, Emergency Heat, Cooling 2), K1 and K2 will be active.

b) ECM Blower – If the DXM2 is configured for an ECM blower, OR an ECM blower is detected, the DXM2 will directly control an ECM blower using selected or default airflows for each operating mode. When operating an ECM blower, the K1 relay becomes a loop pump relay active anytime the compressor relay is active, and the K2 relay becomes a HWG pump relay.

c) Single Speed PSC Blower – If the DXM2 is configured for a single speed PSC blower, the K1 relay will operate as the blower relay, and the K2 relay becomes a HWG pump relay.

d) Dual Stage PSC Blower – If the DXM2 is configured for a dual stage PSC blower, the K1 relay will operate as a blower enable relay, and the K2 relay will operate as a blower speed relay. The dual stage PSC configuration operates very similar to the 2 Speed PSC, except the blower enable relay is not de-activated when the blower speed relay is switched.

e) No Blower – If the DXM2 is configured for no blower (TTS and TTP units), the K1 relay will become a loop pump relay and the K2 relay will become a HWG pump relay.

ECM Blower Operation – When the DXM2 is configured to operate an ECM Blower, or an ECM Blower is connected to the DXM2, the ECM blower will be directly controlled by the DXM2, with advanced operating features including:

a) Airflow Settings – The DXM2 allows the target airflow for each operating mode to be selected individually, within the allowable operating range.

b) Soft Start Ramping – During the first 2 minutes of blower operation during a heating or cooling demand, the ECM blower will ramp up to the selected target

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airflow for the current operating mode. For the first 30 seconds of blower operation, the target airflow will be 50% of the normal target airflow. For the next 90 seconds of blower operation, the target airflow will be 75% of the normal target airflow. For Constant Fan, Emergency Heat, and Test Mode operation, the Soft Start Ramping profile is bypassed, and the ECM immediately ramps up to the normal target airflow.

c) Blower Off Delays – For ECM blower off delays, the target airflow will be adjusted to 50% of normal target airflow before the beginning of the blower off delay.

d) Default Blower Operation – If the DXM2 configuration is incorrect or incomplete with an ECM Blower connected, the ECM will be operated using default target airflows and operating parameters, and an ECM configuration fault will be active.

Hot Water Generator Operation – When the DXM2 is configured to operate a hot water generator pump, the pump will be directly controlled by the K2 relay, based on the S3 dipswitch settings and the T5 (hot water temperature) and T6 (compressor discharge temperature) inputs. Hot water generator operating features include:

a) HWG operating setpoint selection (S3–3)

b) Temperature offset verification for efficient HWG operation

c) HWG test mode (S3–2)

Proportional Valve Operation – When the DXM2 is configured to operate a proportional valve (optional), the valve will be directly controlled by the DXM2. For controlling the proportional valve, the DXM2 monitors the entering water temperature and leaving water temperature. The valve is controlled in the following way:

a) Maintain the appropriate temperature difference across the water coil (EWT–LWT for heating, LWT–EWT for cooling).

b) Maintain the leaving water temperature below the appropriate Maximum Heating LWT and above the Minimum Cooling LWT limits.

SPECIAL DXM2 APPLICATION NOTES / ACCESSORY RELAYS

Generally the following applications are based upon configuring the accessory relays.

Cycle with Fan – If Accessory relay 1 is configured to “cycle with fan”, Accessory relay 1 will be on any time the Fan Enable relay, or ECM Blower is on.

Cycle with Compressor – If Accessory relay 2 is configured to “cycle with compressor”, Accessory relay 2 will be on any time the Compressor relay is on.

Digital Night Setback – If an Accessory relay is configured for Digital NSB, the Accessory relay will be on any time the NSB input is connected to Ground “C”.

Note: If there are no Accessory relays configured for Digital NSB, and the DXM2 is not connected to a communicating thermostat configured for night setback, then the NSB and OVR inputs are automatically configured for “mechanical” operation. See Mechanical NSB operation below.

Note: Digital Night Setback feature requires a compatible thermostat. Contact the manufacturer for information on compatible thermostats.

Mechanical Night Setback – When the NSB input is connected to Ground “C”, all thermostat inputs (G, Y1, Y2, W, and O) are ignored. A thermostat setback Heating call can then be connected to the OVR input. If the OVR input becomes active, then the DXM2will enter NLL Staged Heating Mode. NLL Staged Heating Mode would then provide heating during the NSB period.

Water Valve/Slow Opening – If an Accessory relay is configured for Water Valve/Slow Opening, the Accessory relay will turn on 60 seconds prior to the Compressor Relay turning on.

Outside Air Damper – If an Accessory relay is configured for OAD, the Accessory relay will normally turn on any time the Fan Enable relay is on. But, following a return from NSB (NSB input no longer connected to Ground “C”) to Normal Mode, the Accessory Relay will not turn on for 30 minutes even if the Fan Enable Relay is on. After this 30-minute timer expires, the Accessory Relay will turn on if the Fan Enable Relay is on.

Humidifier – If Accessory relay 2 is configured for a Humidifier, the Accessory relay will be on any time the H input is active.

Hydronic Economizer – If Accessory relay 1 is configured to be used as a hydronic economizer, normal cooling operation will be modified.

If Accessory relay 1 is configured as a single stage hydronic economizer, when a first stage cooling demand is present and the H input is active, the accessory relay will be activated instead of the compressor output. All other heat pump operating modes will operate normally, and the accessory relay will be off in all other operating modes.

If Accessory relay 1 is configured as a hydronic economizer for both stages, when a first stage cooling demand is present and the H input is active, the accessory relay will be activated instead of the compressor output. When a second stage cooling demand is present with the H input active, the accessory relay will be activated in addition

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to the compressor output. All other heat pump operating modes will operate normally, and the accessory relay will be off in all other operating modes.

Thermostat Inputs – Table 5 shows the resulting demand from differing combinations of inputs.

Y1 – Y1 is the input for compressor stage 1 if DIP1.3 = on. Y1 is the input for Cooling Stage 1 if DIP1.3 = off.
Y2 – Y2 is the input for compressor stage 2 if DIP1.3 = on. Y2 is the input for Cooling Stage 2 if DIP1.3 = off.
W – If Y1 and Y2 are active and DIP1.3 = on, then W is the input for Heating Stage 3. If Y1 and Y2 are not active and DIP1.3 = on, then W is the input for Emergency Heat. If DIP1.3 = off, then W is the input for Heating Stage 1.
O – O is the input for Reversing Valve Relay if DIP1.3 = on and DIP1.4 = on. O is the input for Heating Stage 2 if DIP1.3 = off. O is the input for "Heat Mode" if DIP1.3 = on and DIP1.4 = off; this means that the thermostat outputs a "B" call when in Heating Mode and does NOT have an "O" output. The DXM2 Control will employ "Smart RV" control. This ensures that the RV will only switch positions if the thermostat has called for a Heating/Cooling Mode change.
G – G is the input for Constant Fan Operation.

NSB and Override – NSB is the input for Night Setback Mode. When Digital NSB is selected via the Accessory Relays Dipswitch inputs and the NSB input is connected to Ground "C", then the appropriately configured Accessory Relay is turned on to signal the digital thermostat to go to Night Setback Setpoints. Stated differently, when configured for Digital NSB Mode, the Accessory Relay directly tracks the NSB input.

Note: Digital Night Setback feature requires a compatible thermostat. Contact the manufacturer for information on compatible thermostats.

When Digital NSB is NOT selected via the Accessory Relays Dipswitch inputs and a communicating thermostat configured for night setback is not connected, when the NSB input is connected to Ground "C", then Y1, Y2, W, O, and G inputs are ignored. During this time period, if OVR is momentarily connected to 24VAC, then Y1, Y2, W, O, and G are once again monitored for 2 hours. After the 2 hour override period, the DXM2 reverts back to ignoring Y1, Y2, W1, O, and G, assuming the NSB input is still connected to Ground "C". There will be a random start timer when coming back from NSB Mode.

Note: The maximum number of DXM2Controls with daisy-chained "NSB" terminals is 75. Also, the maximum total wire resistance of the "NSB" wiring is 500 Ohms.

OVR – OVR is the input for Night Setback Override or Night Low Limit Staged Heating input (NLL). When Digital NSB is NOT selected via the Accessory Relays Dipswitch inputs and a communicating thermostat configured for night

Table 4: Thermostat Inputs With Resulting Demands

Thermostat Operating Modes												
Mode	Input[3]						Output					
	O	G	Y1	Y2[4]	W	H / DH	RV	Fan	1st stg H/C	2nd stg H/C[4]	AUX	Reheat
No Demand	ON/OFF	OFF	OFF	OFF	OFF	OFF	ON/OFF	OFF	OFF	OFF	OFF	OFF
Fan Only	ON/OFF	ON	OFF	OFF	OFF	OFF	ON/OFF	ON	OFF	OFF	OFF	OFF
Cooling 1st Stage	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
Cooling 2nd Stage	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF	OFF
Cooling & Dehumidistat[1]	ON	ON	ON	ON/OFF	OFF	ON	ON	ON	ON	ON/OFF	OFF	OFF
Dehumidistat Only	ON/OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	ON
Heating 1st Stage	OFF	ON	ON	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
Heating 2nd Stage	OFF	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
Heating 3rd Stage	OFF	ON	ON	ON	ON	OFF	OFF	ON	ON	ON	ON	OFF

[1] Cooling input takes priority over dehumidification input.
[3] Above inputs assume DIP 1.3 is in the heat pump position, and DIP 1.4 is in the O position. When 1.3 is in the heat/cool position, Y1 & Y2 are used for cooling inputs; W and O are used for heating inputs. When 1.4 is in the B position, the O column would be opposite logic.
[4] N/A for single stage units; Full load operation for dual capacity units.
[5] ON/OFF = Either ON or OFF; H/C = Either Heating or Cooling.

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setback is not connected and NSB is connected to Ground "C", then if OVR is momentarily connected to 24VAC (minimum 1 second) then the OVR input is recognized as a Night Setback Override signal and the DXM2Control reverts from Night Setback and begins monitoring thermostat inputs for heating and cooling calls for a 2 hour override period. If NSB is connected to ground "C", then if OVR is continuously connected to 24VAC, then the OVR input is recognized as a call for NLL Staged Heating and the control enters NLL Staged Heating.

ESD – ESD is the input for Emergency Shutdown Mode. When the ESD input is connected to Ground "C", all inputs are ignored and all outputs are turned off. There will be a random start timer when coming back from ESD.

H – The H input function is determined by the setting of DIP2.7, assuming the control is not controlling a internal flow center or an accessory relay is not configured for Whole House Dehumidification or humidifier operation.

If DIP2.7 = on then the H input is defined as Automatic Dehumidification Mode and is used as an "automatic"

Table 5: System Inputs with the resulting demand.
Table 5 describes demand changes with differing system input (ESD, NSB, OVR) and DIP input settings. Resulting Demand #1 is derived from Table 4.

Resulting Demand #1 (From Table 4)	System Inputs			NSB Type	Resulting Demand #2 (After ESD, NSB)
	ESD	NSB	OVR		
-	X	-	-	-	ESD
Invalid	-	-	-	-	Invalid
All (Excluding Invalid)	-	-	-	-	All (Excluding Invalid)
All (Excluding Invalid)	-	-	M	-	All (Excluding Invalid)
C1, C2	-	-	X	-	Invalid
OFF, F, H1, H2, or H3	-	-	X	-	NLL Staged Heating
EH	-	-	X	-	EH
All (Excluding Invalid)	-	X	-	Mechanical	Standby/OFF
All (Excluding Invalid)	-	X	M	Mechanical	All for 2 hours and then revert to Stand-by/OFF (Excluding Invalid)
C1, C2	-	X	X	Mechanical	Invalid
OFF, F, H1, H2, or H3	-	X	X	Mechanical	NLL Staged Heating
EH	-	X	X	Mechanical	EH
All (Excluding Invalid)	-	X	-	Digital / Comm	All (Excluding Invalid)
All (Excluding Invalid)	-	X	M	Digital / Comm	All (Excluding Invalid)
C1, C2	-	X	X	Digital / Comm	Invalid
OFF, F, H1, H2. or H3	-	X	X	Digital / Comm	NLL Staged Heating
EH	-	X	X	Digital / Comm	EH

"M" is momentary input
"X" is continuous input

counterpart to DIP1.5, meaning if H is connected to 24VAC then the selected fan outputs will operate using dehumidification speeds and airflow settings for cooling. If H is not connected to 24VAC then the selected fan outputs will operate using normal speeds and airflow settings for cooling.

If DIP2.7 = off then the H input is defined as High Speed Fan input and is used as an input to call for High Speed Fan. If the control is in normal operating modes such as Standby, Cooling or Heating AND the H input is connected to 24VAC, then the selected fan outputs will operate using high speed, or high speed airflows at all times (this operation is a high speed fan version of the G input).

Other Outputs
Electric Heat – Outputs EH1 and EH2 turn on whenever the DXM2 Control is in the following modes: Heating Stage 3, Emergency Heat, and Boilerless Operation.
Status LED – The Status LED is green. The Status LED indicates the operating status of the DXM2 Control. See Table 4: "LED and Alarm Relay Operation".
Fault LED – The Fault LED is red. The Fault LED displays the current operating status of the control, or flashes the corresponding code for the last fault that has occurred if the test mode is active. If there is no fault in memory, then the Fault LED will flash Code 1. If the Fault type is "Primary" (HP, LP, LT1, LT2, or CO) then the Fault type will always be retained in memory (Primary faults will overwrite Secondary faults). If the Fault type is "Secondary" (Over/

Table 6: "H" input with resulting demand modes.
Table 6 describes demand changes with "H" input and DIP 2.1-2.3, and 2.7 settings. Resulting Demand #2 is derived from Table 5.

Resulting Demand #2 (From Table 5)	H	Auto Dehum / F2 DIP 2.7	Resulting Demand # 3 (After DIP 2.1-2.3, 2.7 Logic)
Standby/OFF	X	Auto Dehum Mode	Standby/OFF with Auto
Dehum enabled			
Standby/OFF	X	High Fan Mode	F2
F1	X	Auto Dehum Mode	F1 with Auto Dehum enabled
F1	X	High Fan Mode	F2
C1	X	Auto Dehum Mode	C1 with fan destage
C1	X	High Fan Mode	*Cooling with High Fan
C2	X	Auto Dehum Mode	C2 with fan destage
C2	X	High Fan Mode	*Cooling with High Fan
H1	X	Auto Dehum Mode	H1
H1	X	High Fan Mode	Heating with High Fan
H2	X	-	H2
H3	X	-	H3
EH	X	-	EH
Invalid	-	-	Invalid

* = signifies that High Fan is locked on regardless of any Dehum demands

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Under Voltage, UPS or Swapped LT1/LT2) then the Fault type will only be retained if there are no “Primary” faults in memory. The Secondary Fault types will not “overwrite” the Primary fault memory. See Table 4: “LED and Alarm Relay Operation”.

Communications

The DXM2 has a single RS485 communications port that provides communication capabilities for communicating thermostats or connecting with other communicating controls.

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Table 7: Replacement Thermistor LT1, LT2 Part Numbers

Thermistor Type	Tube OD	Lead Length (in.)			
		36	48	96	192
LT1 (Gray)	3/8, 1/2	17B0005N06	N/A	17B0005N04	N/A
	5/8, 7/8	N/A	N/A	17B0004N01	N/A
LT2 (Violet)	3/8, 1/2	N/A	17B0005N02	N/A	17B0005N05
	5/8, 7/8	N/A	N/A	N/A	17B0004N02

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Pressure Switches
All pressure switches are designed to be normally closed during normal operating conditions, and to open upon fault.

Condensate Sensor – The Condensate Sensor input will fault upon sensing impedance less than 100,000 Ohms for 30 continuous seconds. The recommended design uses a single wire terminated with a male 1/4" quick connect located in the drain pan at desired trip level. Upon a high condensate level the water will short between the air coil and the quick connect producing a resistance less than 100,000 Ohms. Since condensate is free of impurities, it has no conductivity. Only the impurities from the drain pan and coil dust or dirt create the conductance. A second ground wire with appropriate terminal to the drain pan can be used with the control to replace the air coil ground path. The Condensate Sensor can also essentially be any open contact that closes upon a fault condition.

Thermistor Temperature Sensors – The thermistors used with the DXM2 are NTC (negative temperature coefficient) type. Table 7 shows the replacement part numbers for the LT1 and LT2 thermistors. The sensors have a 1% tolerance and follow the characteristics shown in Table 8. Table 9 shows the nominal resistance at any given temperature and can be used for field service reference. The sensor will use a minimum of 24 awg wire.

Table 8: 1% Sensor Calibration Points

Temp (°F)	Minimum Resistance (Ohm)	Maximum Resistance (Ohm)	Nominal Resistance (Ohm)
78.5	9523	9715	9619
77.5	9650	9843	9746
76.5	10035	10236	10135
75.5	10282	10489	10385
33.5	30975	31598	31285
32.5	31871	32512	32190
31.5	32653	33310	32980
30.5	33728	34406	34065
1.5	80624	82244	81430
0.5	83327	85002	84160
0.0	84564	86264	85410

Table 9: Nominal resistance at various temperatures

Temp (°C)	Temp (°F)	Resistance (kOhm)	Temp (°C)	Temp (°F)	Resistance (kOhm)
-17.8	0.0	85.41	55	131.0	2.99
-17.5	0.5	84.16	56	132.8	2.88
-16.9	1.5	81.43	57	134.6	2.77
-12	10.4	61.70	58	136.4	2.67
-11	12.2	58.40	59	138.2	2.58
-10	14.0	55.30	60	140.0	2.49
-9	15.8	52.40	61	141.8	2.40
-8	17.6	49.60	62	143.6	2.32
-7	19.4	47.00	63	145.4	2.23
-6	21.2	44.60	64	147.2	2.16
-5	23.0	42.30	65	149.0	2.08
-4	24.8	40.10	66	150.8	2.01
-3	26.6	38.10	67	152.6	1.94
-2	28.4	36.10	68	154.4	1.88
-1	30.2	34.30	69	156.2	1.81
0	32.0	32.60	70	158.0	1.75
1	33.8	31.00	71	159.8	1.69
2	35.6	29.40	72	161.6	1.64
3	37.4	28.00	73	163.4	1.58
4	39.2	26.60	74	165.2	1.53
5	41.0	25.30	75	167.0	1.48
6	42.8	24.10	76	168.8	1.43
7	44.6	23.00	77	170.6	1.38
8	46.4	21.90	78	172.4	1.34
9	48.2	20.80	79	174.2	1.30
10	50.0	19.90	80	176.0	1.26
11	51.8	18.97	81	177.8	1.22
12	53.6	18.09	82	179.6	1.18
13	55.4	17.25	83	181.4	1.14
14	57.2	16.46	84	183.2	1.10
15	59.0	15.71	85	185.0	1.07
16	60.8	15.00	86	186.8	1.04
17	62.6	14.32	87	188.6	1.00
18	64.4	13.68	88	190.4	0.97
19	66.2	13.07	89	192.2	0.94
20	68.0	12.49	90	194.0	0.92
21	69.8	11.94	91	195.8	0.89
22	71.6	11.42	92	197.6	0.86
23	73.4	10.92	93	199.4	0.84
24	75.2	10.45	94	201.2	0.81
25	77.0	10.00	95	203.0	0.79
26	78.8	9.57	96	204.8	0.76
27	80.6	9.17	97	206.6	0.74
28	82.4	8.78	98	208.4	0.72
29	84.2	8.41	99	210.2	0.70
30	86.0	8.06	100	212.0	0.68
31	87.8	7.72	101	213.8	0.66
32	89.6	7.40	102	215.6	0.64
33	91.4	7.10	103	217.4	0.62
34	93.2	6.81	104	219.2	0.60
35	95.0	6.53	105	221.0	0.59
36	96.8	6.27	106	222.8	0.57
37	98.6	6.02	107	224.6	0.56
38	100.4	5.78	108	226.4	0.54
39	102.2	5.55	109	228.2	0.53
40	104.0	5.33	110	230.0	0.51
41	105.8	5.12	111	231.8	0.50
42	107.6	4.92	112	233.6	0.48
43	109.4	4.73	113	235.4	0.47
44	111.2	4.54	114	237.2	0.46
45	113.0	4.37	115	239.0	0.45
46	114.8	4.20	116	240.8	0.43
47	116.6	4.04	117	242.6	0.42
48	118.4	3.89	118	244.4	0.41
49	120.2	3.74	119	246.2	0.40
50	122.0	3.60	120	248.0	0.39
51	123.8	3.47	121	249.8	0.38
52	125.6	3.34	122	251.6	0.37
53	127.4	3.22	123	253.4	0.36
54	129.2	3.10			

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DXM2 Thermostat Details

THERMOSTAT COMPATABILITY - IT IS STRONGLY RECOMMENDED THAT A COMMUNICATING THERMOSTAT (7602-443) BE USED WITH GEOMAX COMMUNICATING SYSTEMS FOR:

1. Four-wire connections between the thermostat, compressor section (HTS), and air handler (WDG).
2. Configuring, monitoring and diagnosing the system in PLAIN ENGLISH on the thermostat.

Thermostat Compatibility
Most all heat pump and heat/cool thermostats can be used with the DXM2 Control. For additional diagnostic capabilities, the communicating thermostat is recommended.

Anticipation Leakage Current
Maximum leakage current for “Y1” is 50mA and for “W” is 20mA. Triacs can be used if leakage current is less than above. Thermostats with anticipators can be used if anticipation current is less than that specified above.

Thermostat Signals
- “Y1”, “Y2”, “W”, “O”, and “G” have a 1 second recognition time when being activated or being removed.
- “R” and “C” are from the transformer.
- “AL1” and “AL2” originate from the Alarm Relay.
- “A” is paralleled with the compressor output for use with well water solenoid valves.

Safety Listing
The DXM2 Control is listed under UL 873, and is CE listed under IEC 60730.

Basic Troubleshooting Information

General Troubleshooting
Basic DXM2 board troubleshooting in general is best summarized as simply verifying inputs and outputs. After this process has been verified, confidence in board operation is confirmed and the trouble must be else where. Below are some general guidelines required for developing training materials and procedures when applying the DXM2 Control.

DXM2 Field Inputs
All conventional inputs are 24VAC from the thermostat and can be verified using a voltmeter between C and Y1, Y2, W, O, and G.

Sensor Inputs
All sensor inputs are 'paired wires' connecting each component with the board. Therefore continuity on pressure switches can be checked at the board connector.

The thermistor resistance should be measured with the connector removed so that only the impedance of the thermistor is measured. If desired, this reading can be compared to the chart shown in the thermistor section of this manual based upon the actual temperature of the thermistor clip. An ice bath can be used to check calibration of a thermistor if needed.

DXM2 Outputs
The compressor relay is 24VAC and can be verified using a voltmeter. The Alarm Relay can either be 24VAC as shipped or dry contacts (measure continuity during fault) for use with DDC by clipping the J4 jumper. Electric heat outputs are 24VDC and require a voltmeter set for DC to verify operation. When troubleshooting, measure from 24VDC terminal to EH1 or EH2 terminals.

Test Mode
Test Mode can be entered for 20 minutes by pressing the Test button. For Diagnostic ease at a conventional thermostat, the Alarm Relay will also cycle during test mode. The Alarm Relay will cycle on and off similar to the Fault LED to indicate a code representing the last fault, at the thermostat. Test Mode can also be entered and exited by cycling the G input, 3 times within a 60 second time period.

Advanced Troubleshooting and Configuration Information

General
To properly configure and troubleshoot advanced control features, and to aid in troubleshooting basic control features, a communicating thermostat or diagnostic tool with similar capabilities should be used.

System Configuration
All factory installed DXM2 controls have their basic configuration parameters set as part of the factory manufacturing and test process. The System Configuration option under the communicating thermostat Installer menu provides the installer with the ability to adjust ECM target airflows for each operating mode, set control options, setup the loop configuration and parameters, and configure field replacement controls.

Airflow Selection – The Airflow Selection menu allows the installer to adjust the ECM target airflow for each control operating mode, as well as independently set the heating and cooling blower off delays.

ECM Airflows – Independent airflow selections may be made for each stage of heating operation, each stage of cooling operation with and without dehumidification, as well as constant fan operation. The DXM2 control has set minimum and maximum airflow limits for each operating mode, based on the unit configuration that may not be changed.

Non-ECM Configuration – If the DXM2 is not configured to control an ECM blower, the airflow selections will not be available on the Airflow Selection menu.

Heating / Cooling Off Delays – The heating and cooling mode blower off delay times may be independently adjusted by the user. Each delay time may be set between 0 and 255 seconds.

Option Selection – The Option Selection menu allows the installer to set selected control options.

LT2 Setpoint – The LT2 setpoint should be set to ANTI-FREEZE ONLY when the unit is configured as a water-to-water unit with anti–freeze in the load side loop. For ALL other unit configurations, the LT2 setpoint should be set to WATER.

Motorized Valve – The Motorized Valve option should be set to ON when a motorized water valve with end switch wired to the DXM2 Y1 is used with a communicating thermostat. For all other system configurations, the Motorized Valve option should be set to OFF.

Unit Configuration – Selections under the Unit Configuration menu are normally set at the factory as a normal part of the manufacturing and test process. This menu allows the configuration to be modified for special applications, or to configure field replacement controls. The Unit Configuration menu provides the ability to select the Heat Pump Family, Unit Size, Blower Type, and Loop Type. The Heat Pump Family, Unit Size, and Blower Type are needed to properly operate any particular unit configuration, especially those with ECM blowers.

Heat Pump Family – When replacing a control in the field, the Heat Pump Family value must be set for proper blower and loop operation. The valid family values (HEV/H and other Communicating units) are available for the user to scroll through to select the proper value.

Heat Pump Size – When replacing a control in the field, the Heat Pump Size value must be set for proper blower operation. After a Heat Pump Family has been selected, the valid Heat Pump Size values will be available for the user to scroll through to select the proper value.

Blower Type – When replacing a control in the field, the Blower Type value must be set for proper operation. The valid Blower Type values will be available for the user to scroll through to select the appropriate value from No Blower, ECM Blower, or PSC configurations.

Loop Configuration – When replacing a control in the field, the Loop Configuration value must be set for proper operation. The valid Loop Configuration values will be available for the user to scroll through to select the appropriate value from VS PUMP, MOD VALVE, or OTHER.

Loop Configuration – The Loop Configuration menu allows the installer to set the operating parameters for either an internal flow center, or a proportional water valve, depending on the unit configuration.

Heating Delta T – The Heating Delta T option allows the target delta T (EWT – LWT) value selection for operating in the heating mode. The DXM2 control has set minimum and maximum delta T limits that may not be changed.
Cooling Delta T – The Cooling Delta T option allows the target delta T (LWT – EWT) value selection for operating in the cooling mode. The DXM2 control has set minimum and maximum delta T limits that may not be changed.

Advanced Troubleshooting and Configuration Information

Service Mode
The Service Mode provides the installer with several functions for troubleshooting, including Manual Operation, Control Diagnostics, Control Configuration, and Fault History.

Manual Operation – The Manual Operation mode allows the installer to bypass normal thermostat timings and operating modes, to directly activate the thermostat inputs to the DXM2, activate the DXM2 Test mode, and directly control the ECM blower, internal flow center, and proportional valve.

Control Diagnostics – The Control Diagnostics menus allow the installer to see the current status of all DXM2 control switch inputs, values of all temperature sensor inputs, control voltage, ECM blower, internal flow center, and proportional valve operating status and parameters.

Dipswitch Configuration – The Dipswitch Configuration menus allow the installer to easily see the current DXM2 control configuration.

Fault History – In addition to the fault code, the DXM2 stores the status of all control inputs and outputs when a fault condition is detected. The fault history covering the last five lockout conditions is stored and may be retrieved from the DXM2. After a specific fault in the fault history is selected, the operating mode and time when the fault occurred are displayed, with options to select specific control status values when the lockout occurred.

Fault Temp Conditions – This option displays the DXM2 temperature and voltage values when the lockout occurred.

Fault Flow Conditions – This option displays the DXM2 ECM blower, pump, and valve operating parameters when the lockout occurred.

Fault I/O Conditions – This option displays the status of the DXM2 physical and communicated inputs and the relay outputs when the lockout occurred.

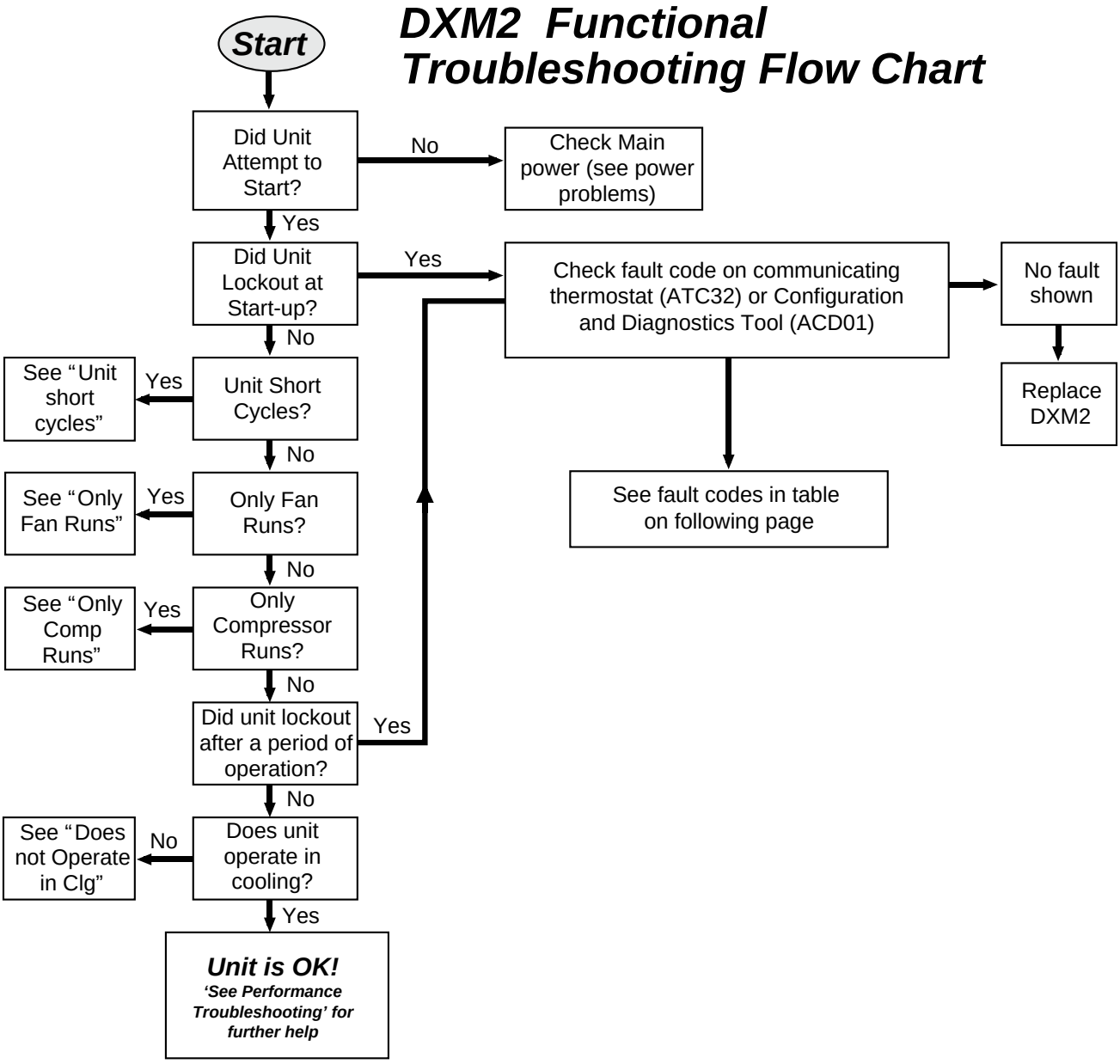
Fault Configuration Conditions – This option displays the status of the DXM2 option selections when the lockout occurred.

Fault Possible Causes – This option displays a list of potential causes of the stored fault.

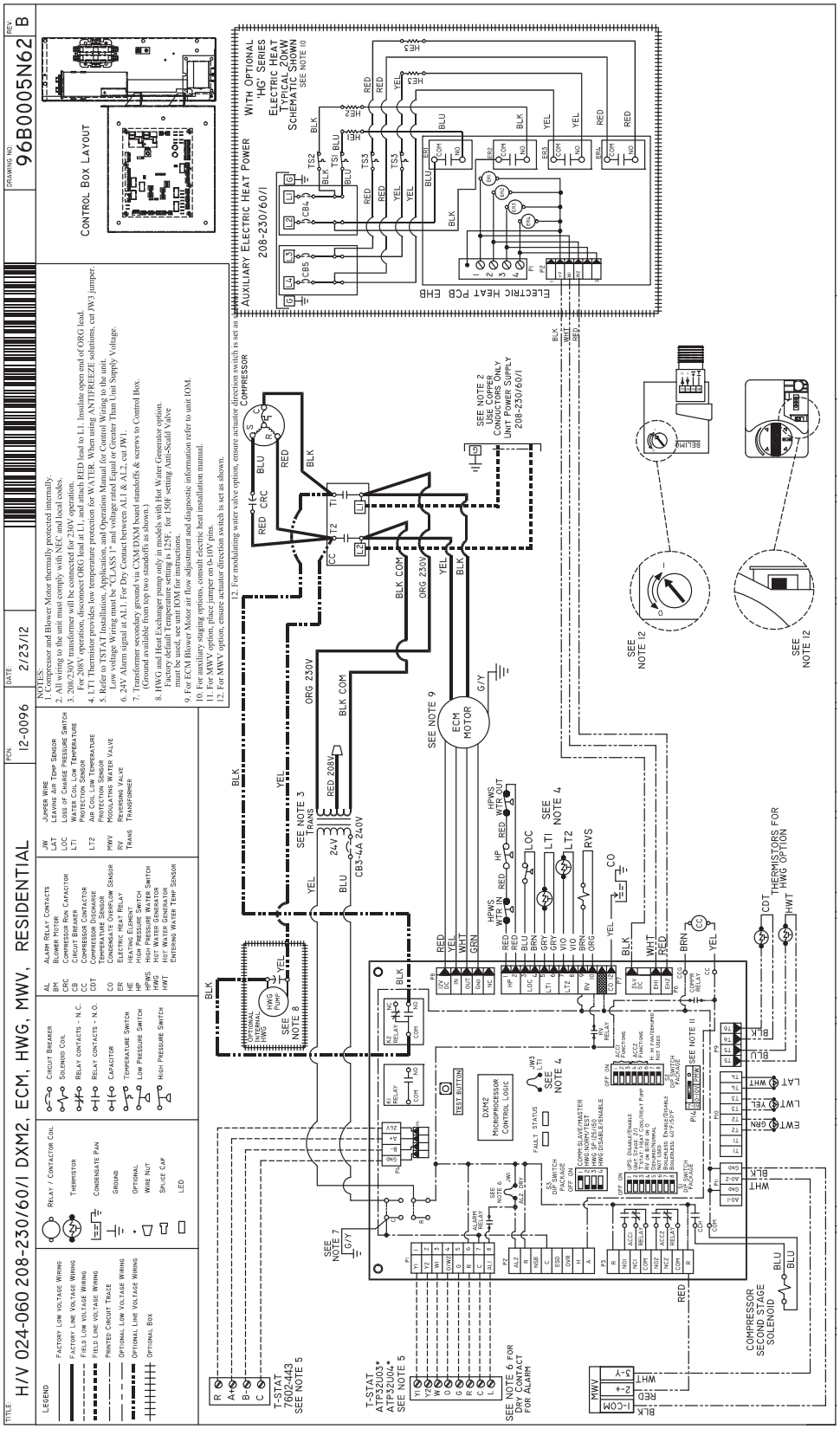
Clear Fault History – The Clear Fault History option allows the fault history stored in the non-volatile memory of the DXM2 to be cleared.

Troubleshooting Chart

Use the following troubleshooting flow chart to find appropriate troubleshooting strategies on the following pages for the DXM2 control and most water source heat pump applications.

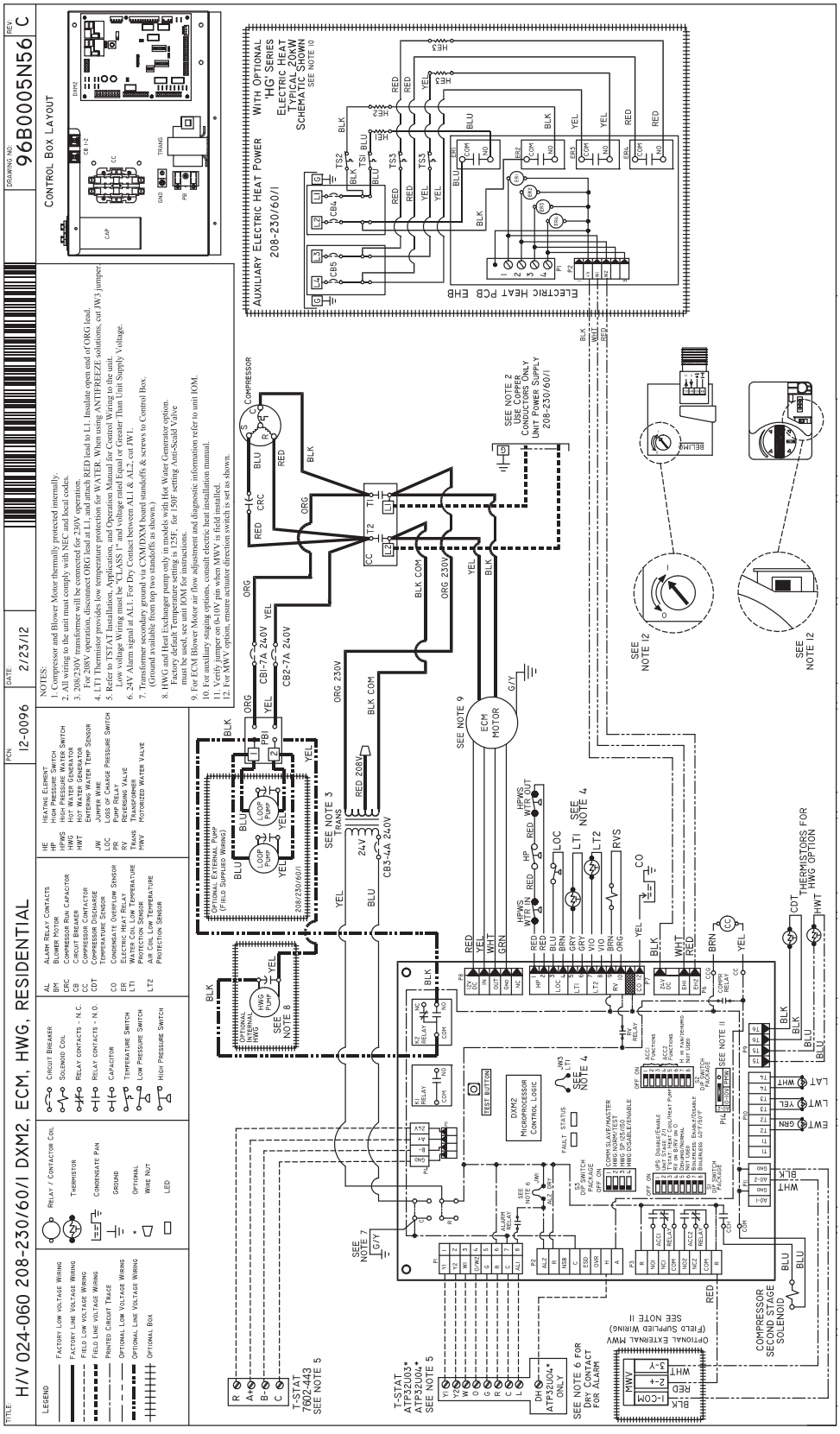


DXM2 Wiring Diagram with Motorized Modulating Water Valve - Optional 96B0005N62


TITLE
H/V 024-060 208-230/60/1 DXM2, ECM, HWG, MWV, RESIDENTIAL
PCN
12-0096
DATE
2/23/12
DRAWING NO.
96B0005N62
REV.
B
CONTROL BOX LAYOUT
WITH OPTIONAL HG SERIES ELECTRIC HEAT TYPICAL SHOWN SEE NOTE 10
AUXILIARY ELECTRIC HEAT POWER 208-230/60/1
ELECTRIC HEAT PCB EHB
COMPRESSOR
SEE NOTE 2 LINE CORDED CONDUCTORS ONLY UNIT POWER SUPPLY 208-230/60/1
SEE NOTE 12
SEE NOTE 9
ECM MOTOR
SEE NOTE 3
TRANS
SEE NOTE 4
SEE NOTE 8
OPTIONAL HWG PUMP
THERMISTORS FOR HWG OPTION
DXM2 MICROPROCESSOR CONTROL LOGIC
SEE NOTE 11
SEE NOTE 7
SEE NOTE 6 FOR Dry Contact FOR ALARM
T-STAT 7602-443 SEE NOTE 5
T-STAT ATP32U03* ATP32U04* SEE NOTE 5
COMPRESSOR SECOND STAGE SOLENOID
LEGEND
FACTORY LOW VOLTAGE WIRING
FACTORY LINE VOLTAGE WIRING
FIELD LOW VOLTAGE WIRING
FIELD LINE VOLTAGE WIRING
PRINTED CIRCUIT TRACE
OPTIONAL LOW VOLTAGE WIRING
OPTIONAL LINE VOLTAGE WIRING
OPTIONAL BOX
RELAY / CONTACTOR COIL
THERMISTOR
CONDENSATE PAN
GROUND
OPTIONAL WIRE NUT
SPLICE CAP
LED
CIRCUIT BREAKER
SOLENOID COIL
RELAY CONTACTS - N.C.
RELAY CONTACTS - N.O.
CAPACITOR
TEMPERATURE SWITCH
LOW PRESSURE SWITCH
HIGH PRESSURE SWITCH
ALARM RELAY CONTACTS
BLOWER MOTOR
CRANKCASE CAP. CAPACITOR
COMPRESSOR CONTACTOR
COMPRESSOR DISCHARGE PROTECTION SENSOR
CONDENSATE OVERFLOW SENSOR
ELECTRIC HEAT RELAY
HEATING ELEMENT
HIGH PRESSURE SWITCH
HOT WATER GENERATOR
HOT WATER GENERATOR ENTERING WATER TEMP SENSOR
JUMPER WIRE
LEAVING AIR TEMP SENSOR
LOSS OF CHARGE PRESSURE SWITCH
WATER COIL LOW TEMPERATURE PROTECTION SENSOR
AIR COIL LOW TEMPERATURE PROTECTION SENSOR
MODULATING WATER VALVE
REVERSING VALVE
TRANSFORMER
NOTES:
1. Compressor and Blower Motor thermally protected internally.
2. All wiring to the unit must comply with NEC and local codes.
3. 208/230V transformer will be connected for 230V operation. For 208V operation, disconnect ORG lead at L1, and attach RED lead to L1. Insulate open end of ORG lead.
4. LT1 Thermistor provides low temperature protection for WATER. When using ANTIFREEZE solutions, cut JW3 jumper.
5. Refer to 7STAT Installation, Application, and Operation Manual for Control Wiring to the unit.
6. 24V Alarm signal at AL1. For Dry Contact between AL1 & AL2, cut JW1.
7. Transformer secondary ground via CXM/DXM board standoffs & screws to Control Box. (Ground available from top two standoffs as shown.)
8. HWG and Heat Exchanger pump only in models with Hot Water Generator option. Factory default Temperature setting is 125F, for 150F setting Anti-Scald Valve must be used, see unit IOM for instructions.
9. For ECM Blower Motor air flow adjustment and diagnostic information refer to unit IOM.
10. For auxiliary staging options, consult electric heat installation manual.
11. For MWV option, place jumper on 24V terminals.
12. For modulating water valve option, ensure actuator direction switch is set as shown.

This diagram includes typical wiring details but is not applicable to all units. For specific unit wiring, refer to the diagram or the units' control panel.

DXM2 Wiring Diagram (Standard Installation) - 96B0005N56


TITLE: H/V 024-060 208-230/60/1 DXM2, ECM, HWG, RESIDENTIAL
PCN: 12-0096
DATE: 2/23/12
DRAWING NO. 96B0005N56
REV. C
CONTROL BOX LAYOUT
AUXILIARY ELECTRIC HEAT POWER 208-230/60/1
'HG' SERIES ELECTRIC HEAT TYPICAL 20KW SCHEMATIC SHOWN SEE NOTE 10
ELECTRIC HEAT PCB EHB
NOTES:
1. Compressor and Blower Motor thermally protected internally.
2. All wiring to the unit must comply with NEC and local codes.
3. Jumper Y1 to terminal strip for two-stage cooling units.
4. For 208V operation, insert ORG lead at L1. Insert RED lead to L1. Insulate open end of ORG lead.
5. LT1 Thermistor provides low temperature protection for WATER. When using ANTIFREEZE solutions, cut JW3 jumper.
6. Refer to TSTAT Installation, Application, and Operation Manual for Control Wiring to the unit.
7. Low voltage Wiring must be "CLASS 1" and voltage rated Equal or Greater Than Unit Supply Voltage.
8. 24V Alarm signal at AL1. For Dry Contact between AL1 & AL2, cut JW1.
9. Transformer secondary ground via CXM/DXM board standoffs & screws to Control Box. (Ground available from top two standoffs as shown.)
10. HWG and Heat Exchanger pump only in models with Hot Water Generator option. Factory default Temperature setting is 125°. for 150° setting Anti-Scald Valve must be used. Consult IOM for instructions.
11. For ECM Blower Motor air flow adjustment and diagnostic information refer to unit IOM.
12. For auxiliary staging options, consult electric heat installation manual.
13. Verify jumper on 0-10V pin when MWV is field installed.
14. For MWV option, ensure actuator direction switch is set as shown.
LEGEND
FACTORY LOW VOLTAGE WIRING
FACTORY LINE VOLTAGE WIRING
FIELD LOW VOLTAGE WIRING
FIELD LINE VOLTAGE WIRING
PRINTED CIRCUIT TRACE
OPTIONAL LOW VOLTAGE WIRING
OPTIONAL LINE VOLTAGE WIRING
OPTIONAL BOX
RELAY / CONTACTOR COIL
THERMISTOR
CONDENSATE PAN
GROUND
OPTIONAL
WIRE NUT
LED
ALARM RELAY CONTACTS
BLOWER MOTOR
CIRCUIT BREAKER
SOLENOID COIL
COMPRESSOR RUN CAPACITOR
FIELD SPLICE
COMPRESSOR CONTACTOR
COMPRESSOR DISCHARGE TEMPERATURE SENSOR
RELAY CONTACTS - N.C.
RELAY CONTACTS - N.O.
CAPACITOR
TEMPERATURE SWITCH
LOW PRESSURE SWITCH
HIGH PRESSURE SWITCH
HEATING ELEMENT
HIGH PRESSURE SWITCH
LOW WATER PRESSURE SWITCH
HOT WATER GENERATOR
HEAT EXCHANGER WATER TEMP SENSOR
JUMPER WIRE
LOSS OF CHARGE PRESSURE SWITCH
PUMP RELAY
REVERSING VALVE
TRANSFORMER
MOTORIZED WATER VALVE
ANTI-FREEZE LOW TEMPERATURE PROTECTION SENSOR
COMPRESSOR
SECOND STAGE SOLENOID
OPTIONAL EXTERNAL MWV (FIELD SUPPLIED WIRING)
SEE NOTE II
SEE NOTE 2 USE COPPER CONDUCTORS ONLY UNIT POWER SUPPLY 208-230/60/1
SEE NOTE 3
SEE NOTE 4
SEE NOTE 5
SEE NOTE 6 FOR DRY CONTACT FOR ALARM
SEE NOTE 7
SEE NOTE 8
SEE NOTE 9
SEE NOTE 12
THERMISTORS FOR HWG OPTION
T-STAT ATP32U03* ATP32U04* SEE NOTE 5
T-STAT 7602443 SEE NOTE 5
ATP32U04* ONLY
ECM MOTOR
DXM2 Microprocessor Control Logic
TEST BUTTON
FAULT STATUS
DIP SWITCH PACKAGE
COMM SLAVE/MASTER
HWG HUM/TEST
HWG DEHUM ENABLE
HP RELAY
COMPR RELAY
ALARM RELAY
CBI-7A 240V
CB2-7A 240V
CB3-4A 240V
208/230/60/1
24V TRANS
ORG 230V
RED 208V
BLK COM
HPWS WTR IN
HPWS WTR OUT
LOOP PUMP
HWG PUMP
EXT. HWG PUMP
ELEMENT
CDT
HWT
LAT
LWT
EWT
GRN
WHT
YEL
BLK
BLU
RED
ORG
BRN
GRY
VIO
GRN/YEL

This diagram includes typical wiring details but is not applicable to all units. For specific unit wiring, refer to the diagram or the units' control panel.

Functional Troubleshooting

⚠ CAUTION! ⚠

CAUTION! Do not restart units without inspection and remedy of faulting condition. Equipment damage may occur.

Fault	Htg	Clg	Possible Cause	Solution
Main Power Problems	X	X	Green status LED off	Check Line Voltage circuit breaker and disconnect
				Check for line voltage between L1 and L2 on the contactor
				Check for 24VAC between R and C on DXM
				Check primary/secondary voltage on transformer
HP Fault Code 2 High Pressure		X	Reduced or no water flow in cooling	Check pump operation or valve operation/setting
				Check water flow adjust to proper flow rate
		X	Water temperature out of range in cooling	Bring water temp within design parameters
	X		Reduced or no air flow in heating	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Dirty air coil- construction dust etc.
				Too high of external static. Check static vs blower table
	X		Air temperature out of range in heating	Bring return air temp within design parameters
	X	X	Overcharged with refrigerant	Check superheat/subcooling vs typical operating condition table
	X	X	Bad HP switch	Check switch continuity and operation - Replace
	X		Frozen water heat exchanger	Thaw heat exchanger
	X	X	Bad HPWS Switch	Replace HPWS Switch
LP/LOC Fault-Code 3 Low Pressure/Loss of Charge	X	X	Insufficient charge	Check for refrigerant leaks
	X		Compressor pump down at start-up	Check charge and start-up water flow
LT1 Fault - Code 4 Water Low Temperature	X		Reduced or no water flow in heating	Check pump operation or water valve operation/setting
				Plugged strainer or filter - clean or replace
				Check water flow adjust to proper flow rate
	X		Inadequate anti-freeze level	Check antifreeze density with hydrometer
	X		Improper low temperature setting (30°F vs 10°F)	Clip LT1 jumper for antifreeze (10°F) use
	X		Water temperature out of range	Bring water temp within design parameters
	X	X	Bad thermistor	Check temp and impedance correlation per chart
LT2 Fault - Code 5		X	Reduced or no air flow in cooling	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Too high of external static - check static vs blower table
		X	Air temperature out of range	Too much cold vent air - bring entering air temp within design parameters
		X	Improper low temperature setting (30°F vs 10°F)	Normal airside applications will require 30°F only
	X	X	Bad thermistor	Check temp and impedance correlation per chart
Condensate Fault-Code 6	X	X	Blocked drain	Check for blockage and clean drain
	X	X	Improper trap	Check trap dimensions and location ahead of vent
		X	Poor drainage	Check for piping slope away from unit
				Check slope of unit toward outlet
				Poor venting - check vent location
		X	Moisture on sensor	Check for moisture shorting to air coil
	X	X	Plugged air filter	Replace air filter
	X	X	Restricted return air flow	Find and eliminate rectriction - increase return duct and/or grille size
Over/Under Voltage-Code 7 (Auto Resetting)	X	X	Under voltage	Check power supply and 24VAC voltage before and during operation
				Check power supply wire size
				Check compressor starting. Need hard start kit?
				Check 24VAC and unit transformer tap for correct power supply voltage
	X	X	Over voltage	Check power supply voltage and 24VAC before and during operation.
				Check 24VAC and unit transformer tap for correct power supply voltage
Unit Performance Sentinel-Code 8	X		Heating Mode LT2>125°F	Check for poor air flow or overcharged unit
		X	Cooling Mode LT1>125°F OR LT2< 40°F	Check for poor water flow, or air flow
Swapped Thermistor Code 9	X	X	LT1 and LT2 swapped	Reverse position of thermistors
ECM Fault - Code 10	X	X	Blower does not operate	Check blower line voltage
				Check blower low voltage wiring
			Blower operating with incorrect airflow	Wrong unit size selection
				Wrong unit family selection
				Wrong motor size
				Incorrect blower selection

Functional Troubleshooting (cont.)

ESD - ERV Fault (DXM Only) Green Status LED Code 3	X	X	ERV unit has fault (Rooftop units only)	Troubleshoot ERV unit fault
No Fault Code Shown	X	X	No compressor operation	See 'Only Fan Operates'
	X	X	Compressor overload	Check and replace if necessary
	X	X	Control board	Reset power and check operation
Unit Short Cycles	X	X	Dirty air filter	Check and clean air filte r
	X	X	Unit in 'Test Mode'	Reset power or wait 20 minutes for auto exit
	X	X	Unit selection	Unit may be oversized for space - check sizing for actual load of space
	X	X	Compressor overload	Check and replace if necessary
Only Fan Runs	X	X	Thermostat position	Insure thermostat set for heating or cooling operation
	X	X	Unit locked out	Check for lockout codes - reset power
	X	X	Compressor overload	Check compressor overload - replace if necessary
	X	X	Thermostat wiring	Check thermostat wiring at DXM2 - put in Test Mode and jumper Y1 and R to give call for compressor

Performance Troubleshooting

Symptom	Htg	Clg	Possible Cause	Solution
Insufficient Capacity/ Not Cooling or Heating Properly	X	X	Dirty filter	Replace or clean
	X		Rduced or no air flow in heating	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Too high of external static - check static vs blower table
		X	Reduced or no air flow in cooling	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Too high of external static - check static vs blower table
	X	X	Leaky duct work	Check supply and return air temperatures at the unit and at distant duct registers if significantly different, duct leaks are present
	X	X	Low refrigerant charge	Check superheat and subcooling per chart
	X	X	Restricted metering device	Check superheat and subcooling per chart - replace
		X	Defective reversing valve	Perform RV touch test
	X	X	Thermostat improperly located	Check location and for air drafts behind stat
	X	X	Unit undersized	Recheck loads & sizing check sensible clg load and heat pump capacity
	X	X	Scaling in water heat exchanger	Perform Scaling check and clean if necessary
	X	X	Inlet water too hot or cold	Check load, loop sizing, loop backfill, ground moisture
High Head Pressure	X		Reduced or no air flow in heating	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Too high of external static - check static vs blower table
		X	Reduced or no water flow in cooling	Check pump operation or valve operation/setting
				Check water flow adjust to proper flow rate
		X	Inlet water too hot	Check load, loop sizing, loop backfill, ground moisture
	X		Air temperature out of range in heating	Bring return air temp within design parameters
		X	Scaling in water heat exchanger	Perform Scaling check and clean if necessary
	X	X	Unit over charged	Check superheat and subcooling - reweigh in charge
	X	X	Non-condensables insystem	Vacuum system and reweigh in charge
	X	X	Restricted metering device	Check superheat and subcooling per chart - replace
Low Suction Pressure	X		Reduced water flow in heating	Check pump operation or water valve operation/setting
				Plugged strainer or filter - clean or replace
				Check water flow adjust to proper flow rate
	X		Water temperature out of range	Bring water temp within design parameters
		X	Reduced air flow in cooling	Check for dirty air filter and clean or replace
				Check fan motor operation and airflow restrictions
				Too high of external static - check static vs blower table
		X	Air temperature out of range	Too much cold vent air - bring entering air temp within design parameters
	X	X	Insufficient charge	Check for refrigerant leaks
Low Dischage Air Temperature in Heating	X		Too high of air flow	Check fan motor speed selection and airflow chart
	X		Poor performance	See “Insufficient Capacity”
High Humidity		X	Too high of air flow	Check fan motor speed selection and airflow chart
		X	Unit oversized	Recheck loads and sizing check sensible clg load and heat pump capacity
Only Compressor Runs	X	X	Thermostat wiring	Check G wiring at heat pump. Jumper G and R for fan operation.
	X	X	Fan motor relay	Jumper G and R for fan operation. Check for Line voltage across blower relay contacts.
				Check fan power enable relay operation (if present)
	X	X	Fan motor	Check for line voltage at motor. Check capacitor
	X	X	Thermostat wiring	Check thermostat wiring at or DXM2. Put in Test Mode and then jumper Y1 and W1 to R to give call for fan, compressor and electric heat.
Unit Doesn't Operate in Cooling		X	Reversing Valve	Set for cooling demand and check 24VAC on RV coil.
				If RV is stuck, run high pressure up by reducing water flow and while operating engage and disengage RV coil voltage to push valve.
		X	Thermostat setup	For DXM2 check for “O” RV setup not “B”.
		X	Thermostat wiring	Check O wiring at heat pump. DXM2 requires call for compressor to get RV coil “Click.”
Modulating Valve Troubleshooting	X	X	Improper output setting	Verify the AO-2 jumper is in the 0-10V position
			No valve output signal	Check DC voltage between AO2 and GND. Should be O when valve is off and between 3.3v and 10v when valve is on.
			No valve operation	Check voltage to the valve
				Replace valve if voltage and control signals are present at the valve and it does not operate

Notes:

Design, material, performance data and components
subject to change without notice.

HEAT CONTROLLER, INC.

1900 Wellworth Ave., Jackson, MI 49203 • Ph. 517-787-2100 • Fax 517-787-9341

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